SWOOKI: A Peer-to-peer Semantic Wiki

Charbel Rahhal, Hala Skaf-Molli, Pascal Molli

SWOOKI: A Peer-to-peer Semantic Wiki

Charbel Rahhal, Hala Skaf-Molli, and Pascal Molli

LORIA – INRIA Nancy-Grand Est, Nancy Université, France
{Charbel.Rahal, skaf, molli}@loria.fr

Abstract. In this paper, we propose to combine the advantages of semantic wikis and P2P wikis in order to design a peer-to-peer semantic wiki. The main challenge is how to merge wiki pages that embed semantic annotations. Merging algorithms used in P2P wiki systems have been designed for linear text and not for semantic data. In this paper, we evaluate two optimistic replication algorithms to build a P2P semantic wiki.

1 Introduction

Nowadays, Wikis are the most popular web-based collaborative writing tools. In spite of their popularity, wikis suffer from the difficulty of navigation and information retrieval. To overcome these problems, some traditional wiki systems turned into semantic wikis. Semantic Wiki is a wiki engine with technologies from semantic web[1] to embed formalized knowledge, content, structures and links in wiki pages. Popular semantic wikis are based on the client-server architecture. All wiki pages reside on a single server that controls operations of distributed users. Consequently, scalability, performance, fault-tolerance and load balancing are major challenges for current semantic wikis. In addition, centralized architecture suffers from censorship problem and does not support off-line work. An approach to solve these problems is to shift from centralized architecture to full distributed (peer to peer) one. In this paper, we address the challenge of transforming a P2P wiki system into a P2P semantic wiki system. In fact, merging algorithms used in P2P wiki systems have been designed for linear text and not for semantic data. In this paper, we show how we can use the existent optimistic replication algorithms to build a P2P semantic wiki.

2 SWOOKI Approach

SWooki is the first attempt to build a peer to peer semantic wiki. SWooki is based on Wooki [1] a peer-to-peer wiki system. SWooki integrates the semantic web technology by following the philosophy of Semantic Media Wiki[2]. The semantic annotations are embedded in the wiki text via a wiki markup e.g. typed links. It follows the *use of wikis for ontologies* approach. A formal ontology emerges

[1] www.w3.org/2001/sw

during the edition of the wiki pages. SWooki provides the same functionalities of any server-based semantic wiki. In addition, SWooki allows the following three interesting use cases for P2P wikis: (1) a *massive collaboration*, (2) the *off-line editing*, and (3) an *ad-hoc collaboration* [3]. In order to combine P2P wiki system with semantic wiki systems, it is very important to know how semantic wikis represent their semantic data and how they combine textual parts with semantic parts. The main issue that we address is how to merge wiki pages that contain semantic annotations and if this combination changes the behavior of the Semantic Media Wiki. In this paper, we investigate how we can combine the Wooki with the Semantic Media wiki. We called this combination SWooki. We adopt Wooki [1] because it supports all use cases for a P2P wiki system previously cited. In Wooki, wiki pages are replicated over all members of the p2p overlay network. A wiki page is considered as a sequence of lines. Each server hosts a copy of pages and can autonomously offer the wiki service. Page copies at each site are maintained by an optimistic replication mechanism called Woot [4] that disseminates changes and ensures consistency. Woot ensures the CSCW principles of convergence and user intentions. The only two available merging algorithms for peer-to-peer wikis are *the Thomas rule* [5] and *Woot* strategy. These algorithms handle linear text. The merge using these algorithms is done by the server which differs from the merge done by the users during concurrent editing in centralized semantic wikis. In case of Thomas rule, only the modifications of the user that lastly saved are kept. In case of Woot, the result includes the modifications of all users. However, the result in Woot is produced by the server and must be reviewed by a human in order to verify its accuracy. The Woot algorithm preserves users intentions, all concurrent effects are visible in the final version of the wiki page. If the user wants to change the result of the merge, he can do that easily. In conclusion, Swooki adopts the Woot algorithm because it provides the best solution for the merge by keeping all concurrent changes made by the users without any lost of updates. The SWooki approach allows to build a P2P semantic wiki very easily by integrating semantic annotations into a P2P wiki. It allows also to balance the load of queries. It provides a cheap way to have many replicas of the same semantic wiki. This total replication of semantic data can be used to distribute semantic queries on different replicas.

References

1. Weiss, S., Urso, P., Molli, P.: Wooki: a p2p wiki-based collaborative writing tool. In: Web Information Systems Engineering, Nancy, France, Springer (2007)
2. Völkel, M., Krötzsch, M., Vrandecic, D., Haller, H., Studer, R.: Semantic Wikipedia. Proceedings of the 15th international conference on World Wide Web (2006)
3. Androutsellis-Theotokis, S., Spinellis, D.: A survey of peer-to-peer content distribution technologies. ACM Computing Surveys (2004)
4. Oster, G., Urso, P., Molli, P., Imine, A.: Data consistency for P2P collaborative editing. Proceedings of the 2006 20th anniversary conference on Computer supported cooperative work (2006) 259–268
5. Johnson, P., Thomas, R.: RFC0677: Maintenance of duplicate databases. Internet RFCs (1975)